<u>REMARKS</u>

Claims 1-46 are pending in the application. Claims 1, 2, 6, 8, 12, 21, 22, 26, 35, and 39 are amended herein. Claims 4, 5, 7, 14, 18-20, 23-25, 27, 33, 34, 36, 40, and 42-44 are canceled without prejudice. New claims 47-49 are added. Applicants respectfully request entry of the foregoing amendments and allowance of the application as amended.

<u>Petition for extension of time</u>

A petition for a three (3) month extension of time under 37 C.F.R. § 1.136(a) is included herewith, as well as the fee under 37 C.F.R. § 1.117(a)(3).

<u>Drawings</u>

The drawings are objected to under 37 CFR 1.83(a). The Office Action states, at page 2-3, that generating at least one transfer function representative of a ratio of energy of the acoustic signal received using at least two different acoustic microphone of the at least two acoustic microphones when the VAD indicates that user voicing activity is absent, and removing acoustic noise from at least one of the acoustic signals by applying the transfer function to the acoustic signals and generating denoised acoustic signals must be shown of the features canceled from the claims. Applicants submit that the drawings currently show every feature of the invention specified in the claims. Applicants respectfully direct the examiner to the following figures and the corresponding description as support for the plurality of independently located microphones: Figure 2, elements $H_1(z)$, $H_2(z)$, $M_1(z)$, and $M_2(z)$, along with paragraphs 0022-0025; Figure 3, elements $H_0(z)$, $H_1(z)$, $H_2(z)$, $H_n(z)$, $G_1(z)$, $G_2(z)$, $G_n(z)$, $M_1(z)$, and $M_2(z)$, along with paragraphs 0026-0047; Figure 4, elements $H_0(z)$, $H_1(z)$, $H_2(z)$, $H_n(z)$, $G_1(z)$, $G_2(z)$, $G_n(z)$, $M_1(z)$, and $M_2(z)$, along with paragraphs 0048-0056. Consequently, as the drawings currently show every feature of the invention specified in the claims, Applicants request withdrawal of this objection.

The drawings are objected to under 37 CFR 1.83(a). The Office Action states, at page 3-4, that a processor coupled among two microphones and at least one voicing sensor, wherein the at least one voicing sensor detects human tissue vibration associated with voicing activity of a user, wherein an absence of voiced information

5   voicing activity is detected during a period using the at least one voicing sensor, wherein at least one acoustic noise source signal is received during the period using the two microphones, wherein the processor generates a transfer function representative of a ratio of acoustic energy received by the two microphones during the period, wherein the microphones receive composite signals comprising acoustic signals and acoustic

10   noise signals, and the processor removes the acoustic noise must be shown of the features canceled from the claims. Applicants submit that the drawings currently show every feature of the invention specified in the claims. Applicants respectfully direct the examiner to the following figures and the corresponding description as support for the plurality of independently located microphones: Figure 1, elements 10, 20, 30, 40,

15   along with paragraph 0021; Figure 2, elements 102, 103, 204, 205, $H_1(z)$, $H_2(z)$, $M_1(z)$, and $M_2(z)$, along with paragraphs 0022-0025; Figure 3, elements MIC 1, MIC 2, $H_0(z)$, $H_1(z)$, $H_2(z)$, $H_n(z)$, $G_1(z)$, $G_2(z)$, $G_n(z)$, $M_1(z)$, and $M_2(z)$, along with paragraphs 0026-0047; Figure 4, elements MIC 1, MIC 2, $H_0(z)$, $H_1(z)$, $H_2(z)$, $H_n(z)$, $G_1(z)$, $G_2(z)$, $G_n(z)$, $M_1(z)$, and $M_2(z)$, along with paragraphs 0048-0056. Consequently, as the

20   drawings currently show every feature of the invention specified in the claims, Applicants request withdrawal of this objection.

Rejections under 35 U.S.C. § 112

      Claim 35 is rejected under 35 U.S.C. §112 as failing to comply with the written

25   description requirement. Applicants respectfully traverse the rejection.

      The Office Action states at pages 5-6 that the specification does not clearly disclose how the processing will be performed such that the processor generates a plurality of transfer functions. Applicants submit that the specification and the drawings currently support every feature of the invention specified in the claims.

30   Applicants respectfully direct the examiner to the following figures and the

corresponding description as support for the plurality of independently located microphones: Figure 2, elements $H_1(z)$, $H_2(z)$, $M_1(z)$, and $M_2(z)$, along with paragraphs 0022-0025; Figure 3, elements $H_0(z)$, $H_1(z)$, $H_2(z)$, $H_n(z)$, $G_1(z)$, $G_2(z)$, $G_n(z)$, $M_1(z)$, and $M_2(z)$, along with paragraphs 0026-0047; Figure 4, elements $H_0(z)$, $H_1(z)$, $H_2(z)$,

5     $H_n(z)$, $G_1(z)$, $G_2(z)$, $G_n(z)$, $M_1(z)$, and $M_2(z)$, along with paragraphs 0048-0056. Consequently, as the above-referenced portions of the specification and the drawings currently support every feature of the invention specified in the claims, Applicants request withdrawal of this rejection.

           Claims 31, 45, and 46 are rejected under 35 U.S.C. §112 as failing to comply

10   with the written description requirement. Applicants respectfully traverse the rejection.

           The Office Action states at pages 5-6 that the specification does not clearly disclose how the processing will be performed such that the processor generates transfer functions. Applicants submit that the specification and the drawings currently support every feature of the invention specified in the claims. Applicants respectfully

15   direct the examiner to the following figures and the corresponding description as support for the plurality of independently located microphones: Figure 2, elements $H_1(z)$, $H_2(z)$, $M_1(z)$, and $M_2(z)$, along with paragraphs 0022-0025; Figure 3, elements $H_0(z)$, $H_1(z)$, $H_2(z)$, $H_n(z)$, $G_1(z)$, $G_2(z)$, $G_n(z)$, $M_1(z)$, and $M_2(z)$, along with paragraphs 0026-0047; Figure 4, elements $H_0(z)$, $H_1(z)$, $H_2(z)$, $H_n(z)$, $G_1(z)$, $G_2(z)$,

20     $G_n(z)$, $M_1(z)$, and $M_2(z)$, along with paragraphs 0048-0056. Consequently, as the above-referenced portions of the specification and the drawings currently support every feature of the invention specified in the claims, Applicants request withdrawal of this rejection.

           Claims 2 and 27 are rejected under 35 U.S.C. §112 as failing to comply with

25   the written description requirement. Applicants amend claims 2 and 27 herein and submit that the amendments herein overcome this rejection. Thus, Applicants request withdrawal of this rejection.

Rejections under 35 U.S.C. § 103

Claims 1-3, 6-13, 15-17, 21, 22, 26-30 and 32-41 are rejected under 35 U.S.C. §103(a) as being unpatentable over Yoshida et al, United States (US) Patent Number 5,473,702 (Yoshida), in view of Holzrichter, US Patent Number 5,729,694

5 (Holzrichter). Applicants respectfully traverse the rejection.

Applicants respectfully submit that Yoshida discloses a system with two microphones in which microphone 1 is disposed relatively close to a voice source and picks up both voice input and background noise, which it provides as a primary audio signal. Microphone 2 is disposed relatively far from the voice source and picks up

10 mainly noise, which it provides as a secondary audio signal. See Yoshida, column 3, lines 10-21.

Yoshida discloses an adaptive noise canceler that uses the secondary audio signal to cancel noise in the primary audio signal. In so doing, the secondary audio signal is filtered according to a set of coefficients to generate an estimated noise signal,

15 which is subtracted from the primary audio signal to generate an error signal. The error signal becomes an audio output signal. See Yoshida, column 1, lines 43-49, and column 3, lines 22-56.

More specifically, the adaptive filter estimates a single transfer function that equalizes the primary digital input signal (generated by sampling the primary audio

20 signal) and the secondary digital input signal (generated by sampling the secondary audio signal) and convolves this transfer function with the secondary digital input signal to generate an estimated noise signal (emphasis added). This estimated noise signal is subtracted from the primary audio signal to generate the error signal, and the error signal becomes the audio output signal. See Yoshida, column 3, lines 57-67.

25 While Yoshida fails to teach the use of two or more transfer functions to generate denoised acoustic signals, Applicants also fail to find any teaching in Holzrichter of the use of two or more transfer functions to generate denoised acoustic signals. Instead of a transfer function, Holzrichter generates a Fourier Transform, which is a measure of the frequency content of a signal. In order to generate a transfer

30 function, two signals (an input and output) are needed. Holzrichter teaches the use of a

single signal and simply transforms the single signal into the frequency domain, which is completely different from, and exclusive of, taking two signals and generating a transfer function. Even the quoted passage in Holzrichter at column 28, lines 38-48 does not discuss time frames – it is simply a discussion of how Holzrichter thinks the end of a speech period should be calculated when a voiced to unvoiced transition takes place. Therefore, Holzrichter does not disclose the use of two or more transfer functions to generate denoised acoustic signals.

Applicants agree with the Examiner's statement (Office Action mailed July 9, 2008, page 8) that Yoshida does not explicitly teach receiving a voice activity signal that includes information on vibration of human tissue associated with human voicing activity of a user. Furthermore, in contrast to claim 1 of the present application as amended herein, and as described above, Applicants submit that Yoshida in view of Holzrichter does not disclose generating at least-two transfer functions representative of a ratio of energy of the acoustic signal received using at least two different acoustic microphones of the at least two acoustic microphones when the VAD indicates that user voicing activity is absent. Moreover, as Yoshida does not disclose generating at least two transfer functions, Yoshida does not disclose removing acoustic noise from at least one of the acoustic signals by applying at least one of the at least two transfer functions to the acoustic signals and generating denoised acoustic signals. For at least these reasons, Applicants respectfully submit that amended claim 1 is patentable over Yoshida in view of Holzrichter.

As claims 2, 3, 6, 8-11, 45, and 47 depend from amended claim 1 and include further limitations thereon, and since amended claim 1 is patentable over Yoshida in view of Holzrichter, Applicants submit that claims 2, 3, 6, 8-11, 45, and 47 are patentable over Yoshida in view of Holzrichter.

In contrast to claim 12 of the present application as amended herein, and as described above, Applicants submit that Yoshida in view of Holzrichter does not disclose generating at least two transfer functions representative of the ratio of energy of the acoustic signal received using the two acoustic microphones when the VAD indicates that user voicing activity is absent. Moreover, as Yoshida does not disclose

generating at least two transfer functions, Yoshida does not disclose removing acoustic noise from the acoustic signal of one of the microphones by applying at least one of the at least two transfer functions to the acoustic signal from that microphone and generating a denoised acoustic signal. For at least these reasons, Applicants respectfully submit that amended claim 12 is patentable over Yoshida in view of Holzrichter.

As claims 13, 15-17, 21, 22, 46, and 48 depend from amended claim 12 and include further limitations thereon, and since amended claim 12 is patentable over Yoshida in view of Holzrichter, Applicants submit that claims 13, 15-17, 21, 22, 46, and 48 are patentable over Yoshida in view of Holzrichter.

In contrast to claim 26 of the present application as amended herein, and as described above, Applicants submit that Yoshida in view of Holzrichter does not disclose a system comprising a processor coupled among a receiver and at least one sensor, the processor generating a plurality of transfer functions, wherein the plurality of transfer functions includes a first transfer function representative of a ratio of energy of acoustic signals received using at least two different acoustic microphones of the at least two acoustic microphones, wherein the first transfer function is generated in response to a determination that voicing activity is absent from the acoustic signals for a period of time, wherein the plurality of transfer functions includes a second transfer function representative of the acoustic signals, wherein the second transfer function is generated in response to a determination that voicing activity is present in the acoustic signals for the period of time, wherein acoustic noise is removed from the acoustic signals using one of the first transfer function and at least one combination of the first transfer function and the second transfer function to produce the denoised acoustic data stream. For at least these reasons, Applicants respectfully submit that amended claim 26 is patentable over Yoshida in view of Holzrichter.

As claims 27-32 and 49 depend from amended claim 26 and include further limitations thereon, and since amended claim 26 is patentable over Yoshida in view of Holzrichter, Applicants submit that claims 27-32 and 49 are patentable over Yoshida in view of Holzrichter.

In contrast to claim 35 of the present application as amended herein, and as described above, Applicants submit that Yoshida in view of Holzrichter does not disclose a signal processing system comprising a denoising system, the denoising system comprising a processor coupled among a receiver and at least one sensor,

5 wherein the processor generates a plurality of transfer functions, wherein a first transfer function representative of a ratio of acoustic energy received by the two microphones is generated in response to a determination that voicing activity is absent from the acoustic signals for a specified period of time, wherein acoustic noise is removed from the acoustic signals using the first transfer function to produce a denoised acoustic data

10 stream, wherein a second transfer function representative of the acoustic signals is generated in response to a determination that voicing activity is present in the acoustic signals for a specified period of time, wherein acoustic noise is removed from the acoustic signals using one of the first transfer function and at least one combination of the first transfer function and the second transfer function to produce a denoised

15 acoustic data stream. For at least these reasons, Applicants respectfully submit that amended claim 35 is patentable over Yoshida in view of Holzrichter.

As claims 37 and 38 depend from amended claim 35 and include further limitations thereon, and since amended claim 35 is patentable over Yoshida in view of Holzrichter, Applicants submit that claims 37 and 38 are patentable over Yoshida in

20 view of Holzrichter.

In contrast to claim 39 of the present application as amended herein, and as described above, Applicants submit that Yoshida in view of Holzrichter does not disclose generating a first transfer function representative of a ratio of energy of the acoustic signals upon determining that voicing activity is absent from the at least two

25 acoustic signals for a specified period of time, generating a second transfer function representative of the at least two acoustic signals upon determining that voicing activity is present in the at least two acoustic signals for the specified period of time, and removing the acoustic noise from the at least two acoustic signals using one of the first transfer function and at least one combination of the first transfer function and the

30 second transfer function to produce the at least one denoised acoustic data stream. For

at least these reasons, Applicants respectfully submit that amended claim 39 is patentable over Yoshida in view of Holzrichter.

As claim 41 depends from amended claim 39 and includes further limitations thereon, and since amended claim 39 is patentable over Yoshida in view of Holzrichter, Applicants submit that claim 41 is patentable over Yoshida in view of Holzrichter.

Claims 31, 45, and 46 are rejected under 35 U.S.C. § 103(a) as being unpatentable over Yoshida as modified by Holzrichter, and Cezanne. Applicant respectfully submits that claims 31, 45, and 46 are not made unpatentable by the combined teachings of Yoshida, Holzrichter, and Cezanne.

Claim 31 depends from amended claim 26 and recites further limitation thereon. As described above with respect to amended claim 26, Yoshida fails to teach or suggest each and every element of amended claim 26, and therefore fails as an anticipatory reference. Moreover, Holzrichter does not provide a teaching or suggestion which would compensate for the deficiencies of Yoshida discussed in detail above. Additionally, Cezanne does not provide a teaching or suggestion which would compensate for the deficiencies of Yoshida or Holzrichter discussed in detail above. Since Holzrichter and Cezanne do not compensate for the deficient teachings of Yoshida, Yoshida, Holzrichter, and/or Cezanne alone and/or in combination do not make obvious the system as claimed in amended claim 26. For at least these reasons, Applicants respectfully submit that amended claim 31 is patentable over Yoshida in view of Holzrichter and Cezanne.

Claim 45 depends from amended claim 1 and recites further limitation thereon. As described above with respect to amended claim 1, Yoshida fails to teach or suggest each and every element of amended claim 1, and therefore fails as an anticipatory reference. Moreover, Holzrichter does not provide a teaching or suggestion which would compensate for the deficiencies of Yoshida discussed in detail above. Additionally, Cezanne does not provide a teaching or suggestion which would compensate for the deficiencies of Yoshida or Holzrichter discussed in detail above. Since Holzrichter and Cezanne do not compensate for the deficient teachings of Yoshida, Yoshida, Holzrichter, and/or Cezanne alone and/or in combination do not

make obvious the method as claimed in amended claim 1. For at least these reasons, Applicants respectfully submit that amended claim 45 is patentable over Yoshida in view of Holzrichter and Cezanne.

Claim 46 depends from amended claim 12 and recites further limitation thereon. As described above with respect to amended claim 12, Yoshida fails to teach or suggest each and every element of amended claim 12, and therefore fails as an anticipatory reference. Moreover, Holzrichter does not provide a teaching or suggestion which would compensate for the deficiencies of Yoshida discussed in detail above. Additionally, Cezanne does not provide a teaching or suggestion which would compensate for the deficiencies of Yoshida or Holzrichter discussed in detail above. Since Holzrichter and Cezanne do not compensate for the deficient teachings of Yoshida, Yoshida, Holzrichter, and/or Cezanne alone and/or in combination do not make obvious the method as claimed in amended claim 12. For at least these reasons, Applicants respectfully submit that amended claim 46 is patentable over Yoshida in view of Holzrichter and Cezanne.

Conclusion

In view of the foregoing amendments and Remarks, Applicants respectfully submit that all objections and rejections have been overcome, and the claims are now allowable. Prompt allowance of the application is earnestly solicited. Examiner Lao is respectfully requested telephone the undersigned to facilitate resolution of any issues prior to allowance of the application.

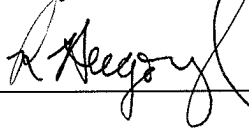## AUTHORIZATION TO CHARGE DEPOSIT ACCOUNT

If there are any fees due and unpaid in this application, please charge Deposit Account No. 503616 for these fees (Attorney Docket No. ALPH.P010X).

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Respectfully submitted,
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10   Date: January 9, 2009

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